A stable finite-difference scheme for population growth and diffusion on a map

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Abstract: We describe a general Godunov-type splitting for numerical simulations of the Fisher-Kolmogorov-Petrovski-Piskunov growth and diffusion equation in two spatial dimensions with Neumann boundary conditions. In particular, the method is appropriate for modeling population growth and dispersal on a terrestrial map. The procedure is semi-implicit, hence quite stable, and approximately $O(x^2) + O(t^2)$ $accurate, excluding boundary condition complications. It also has low memory requirements and shows good perforan$

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